



EFFECTIVENESS OF ICT IN LEARNING CELL BIOLOGY AT STANDARD XI

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ABSTRACT

The major purpose of the study was to explore the impact of ICT on the achievements of students in Cell biology at standard XI. The study was experimental type. Equivalent group study design was used. 60 students were selected for the study. 30 as control group and 30 as the experimental group. Researcher's self-made tool was used to test the achievements of the students in Cell biology. The collected data of both groups were analysed and interpreted using mean, standard deviation and t-test, and conclusions were drawn. The results of the study were in the favour of ICT usage, therefore, it is suggested that ICT should be widely used in conventional classroom at various levels of education.

KEYWORDS: *Achievements of the Students in Cell Biology, Favour of ICT Usage Various Levels of Education*

Article History

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INTRODUCTION

ICT has the capacity to provide higher interactive potential for user's to develop their individual, intellectual and creative ability. The main purpose of ICT "consists just in the development of human mental resources, which allow people to both successfully apply the existing knowledge and produce new knowledge" Shavinina (2001). With appropriate methods, such as ICT-enabled online questionnaires, hundreds of students can be reached simultaneously. Pedagogical phenomena consist of increasingly complex processes. As such, the successful transfer of the curriculum depends on a large number of factors and because of this; it is desirable for teachers to take every opportunity to make biology an appealing subject. Veronika Vegh et al (2017). Integrating ICT pedagogy will lead for quality higher education. The process of teaching-learning process should be modified according to the needs of the changing technology enabled education. ICT directly improves the quality of education and indirectly improves the economy of the country. There are some topics in Biology that students have particular difficulty in learning, such as cell division, chromosomes and the concept of energy. Tekkaya, C., Ozkan, O. and Sungur, S. (2001).

NEED AND SIGNIFICANCE OF THE STUDY

Learners of standard XI face the problems in learning biological science by adopting conventional methods of learning. Students score less marks in achievement tests due to monotony of conventional methods of teaching biological science. Hence the researcher endeavours to find an innovative method for eliminating the problems of the learners and proposes to find out the effectiveness of Blended learning in learning biological science in this study.

STATEMENT OF THE PROBLEM

Students have problems in scoring more marks in Cell biology at standard XI..

OPERATIONAL DEFINITIONS

- **Effectiveness:** The term “effectiveness” refers here to the extent the usage of ICT produced better results in the terms of the scores of students in achievement tests.
- **ICT:** In this study Information and Communication Technology or “ICT,” includes e- lessons from YouTube and web based lessons from the app Diksha.
- **Cell Biology:** Cell biology is a branch of biology that studies the structure and function of the cell, which is the basic unit of life.[1] This study includes three lessons of unit III from the text book of eleventh standard of Government of Tamil Nadu. They are as follows Chapter- 6 Cell: The unit of life, Chapter-7 Cell cycle, Chapter-8- Biomolecules.
- **Standard XI:** It refers to the first year of higher secondary education in science which is the diversified and vocational education after the completion of ten years of secondary education.

OBJECTIVES

- To find out whether there is any significant difference in achievement mean score between the pre- test of control group and post test of control group.
- To find out whether there is any significant difference in achievement means score between the pre- test of experimental group and post test of experimental group.
- To find out whether there is any significant difference in achievement mean score between the post test of control group and post test of experimental group.
- To find out whether there is any significant difference in achievement means score between the post test of experimental group and post test of control group.
- To find out the impact of ICT on the Achievement scores on Cell Biology at standard XI.

Hypotheses: The researcher has framed the following hypotheses.

- There is no significant difference in achievement mean score between the pre- test of control group and post test of control group.
- There is no significant difference in achievement mean score between the pre- test of experimental group and post test of experimental group.
- There is no significant difference in achievement mean score between the post- test of control group and post test of experimental group.
- There is no significant difference in achievement mean score between the post- test of experimental group and post test of control group.

- Usage of ICT would be more effective on the Achievement scores of Cell biology at standard XI than using the conventional method.

VARIABLES

- **Independent Variable:** The traditional method of teaching and the usage of ICT in learning Cell biology.
- **Dependant Variables:** Achievement Scores of the students in Cell biology.

METHODOLOGY

Parallel group Experimental method (control group and experimental group) was adopted for the study.

- **Population:** Standard XI students studying in Tirupur will be considered as population of the study.
- **Sampling:** Sixty students studying in Standard XI at Govt. Higher Secondary School, Tirupur (30 control group +30 Experimental group=60) were selected as sample for the study.
- **Tool:** Researcher's self-made achievement test was considered as a tool for the study.
- **Statistical Technique:** Mean, Median and t test was done to analyse the data.
- **Procedure:** Pre-test_ treatment_ post- test was considered as procedure of the study. Conventional teaching method was adopted for Controlled group. Usage of ICT was be adopted as treatment to the Experimental group.

ANALYSIS AND INTERPRETATION OF DATA

Distribution of Performance Scores of Control Group Students in Pre Test

Pre-test was administered to 30 control group students of standard XI. The distribution of performance scores of the control group is presented in the following Table 1.

Table 1: General Performance Scores of Control Group Students of Standard XI in Pre-Test

Class Interval(Scores)	Frequency	Percentage
1-5	-	-
6-10	16	53.33
11-15	6	20.00
16-20	8	26.67
21-25	-	-
Total	30	100

Distribution of Performance Scores of Experimental Group Students in Pre Test

Pre-test was administered to 30 experimental group students of standard XI. The distribution of performance scores of the experimental group is presented in the following Table 2.

Table 2: General Performance Scores of Experimental Group Students of Standard XI in Pre-Test

Class Interval(Scores)	Frequency	Percentage
1-5	-	-
6-10	15	50.00
11-15	7	23.33
16-20	8	26.70
21-25	-	-
Total	30	100

Distribution of Performance Scores of Control Group Students in Post Test

Post-test was administered to 30 control group students of standard XI. The distribution of performance scores of the control group is presented in the following Table 3.

Table 3: General Performance Scores of Control Group Students of Standard XI in Post-Test

Class Interval(Scores)	Frequency	Percentage
1-5	-	-
6-10	14	46.66
11-15	8	26.67
16-20	8	26.67
21-25	-	-
Total	30	100

Distribution of Performance Scores of Experimental Group Students in Post Test: Post-test was administered to 30 experimental group students of standard XI. The distribution of performance scores of the experimental group is presented in the following Table 4.

Table 4: General Performance Scores of Experimental Group Students of Standard XI in Post-Test

Class Interval(Scores)	Frequency	Percentage
1-5	-	-
6-10	8	26.67
11-15	6	20.00
16-20	9	30.00
21-25	7	23.33
Total	30	100

TESTING OF HYPOTHESIS

The students had problems in learning Cell biology through conventional method at Standard XI. Table 3 indicates that most 50 % of the students of control group scored between 6-10. Table 4 indicates that only 26.67 % of the experimental group scored between 6-10.

From the percentage score in Table 3 and table 4 it is clear that the students of control group had problem in learning biology through the conventional method.

Table 5: Means of Post-Test Scores of Students

Groups	N	Mean
Control	30	11.50
Experimental	30	15.00

INFERENTIAL ANALYSIS

Inferential analysis consists of using probability to make the decision about the population on the basis of sample observation. The main objective of this study is to find out the effectiveness of ICT in enhancing achievement in biological Science at Standard XI. This section describes the inferential analysis of mean achievement scores.

TESTING OF NULL HYPOTHESIS-1

There is no significant difference between the pre-test and post-test mean score of control group.

Table 6 shows the obtained t' value 0.27 is statistically not significant because it is lesser than the critical value 1.96 for 58 df 0.05 level of significance. Therefore the null hypothesis is accepted. From this it can be concluded that there is no significant difference between the mean gain score of pre and post test of control group.

Table 6: Difference between Pre-Test and Post-Test Mean Score of Control Group

Groups	N	Mean	SD	df	't' value	Significance level 0.05
Control Pre test	30	11.17	4.24	58	0.27	Not significant
Control Post test	30	11.50	4.25			

TESTING OF HYPOTHESIS-2

There is no significant difference between the pre-test and the post-test mean score of experimental group.

Table 7 shows the obtained t' value 3.24 is statistically significant because it is greater than the critical value 1.96 for 58 df 0.05 level of significance.

Therefore the null hypothesis is rejected. From this it can be concluded that there is significant difference between the mean gain score of pre and post test of experimental group.

Table 7: Difference between Pre-Test and Post-Test Mean Score of Experimental Group

Groups	N	Mean	SD	df	't' value	Significance Level 0.05
Experimental Pre-Test	30	11.75	4.29	58	3.24	Significant
Experimental Post-Test	30	15.00	5.69			

TESTING OF NULL HYPOTHESIS-3

There is no significant difference between the pre-test mean score of control group and the pre-test mean score of experimental group.

Table 8 shows the obtained t value 0.66 is statistically not significant because it is lesser than the critical value 1.96 for 58 df 0.05 level of significance.

Therefore the null hypothesis is accepted. From this it can be concluded that there is no significant difference between the mean gain score of pre-test of control group and pre-test of experimental group.

Table 8: Difference between Pre-Test Mean Scores of Control Group and Pre-Test Mean Score of Experimental Group

Groups	N	Mean	SD	df	't' value	Significance Level 0.05
Control Pre-Test	30	11.17	4.24	58	0.66	Not significant
Experimental Pre-Test	30	11.75	4.29			

TESTING OF NULL HYPOTHESIS-4

There is no significant difference between the post-test mean scores of control group and the post-test mean scores of experimental group.

Table 9 shows the obtained t' value 3.38 is statistically significant because it is greater than the critical value 1.96 for 58 df 0.05 level of significance.

Therefore the null hypothesis is rejected. From this it can be concluded that there is significant difference between the mean gain score of post-test of control group by conventional method and post-test of experimental group by using ICT.

Table 9: Difference between Pre-Test and Post-Test Mean Score of Control Group

Groups	N	Mean	SD	df	't' value	Significance level 0.05
Control Post-Test	30	11.50	4.25	58	3.38	Significant
Experimental Post-Test	30	15.00	5.69			

ALTERNATE HYPOTHESIS: 5

Usage of ICT is more effective than conventional method. Table -5 indicates that the mean value of the control group is 11.50 and that of the experimental group is 15.00. Hence the students of experimental group have scored more marks through the usage of ICT than control group in their achievement in Cell biology at Standard XI. Thus it shows that the usage of ICT is more effective than conventional method in enhancing achievement in Cell biology at Standard XI.

FINDINGS OF THE STUDY

- The students of Standard XI have learning problems in learning Biological Science in Chinnasamy Ammal Corporation Hr. Sec. School, Tirupur.
- There is no significant difference between the pre-test and post-test mean score of control group.
- There is a significant difference between the mean score of pre-test and post-test mean score of experimental group.
- There is no significant difference between the pre-test mean scores of control group and the experimental group.
- There is a significant difference between the post-test mean scores of control group and experimental group.

CONCLUSION OF THE STUDY

Research in any area is only a humble beginning to explore the cause and effect relationships. Usage of ICT and its full potential is yet to be realized in the field of education. In this way this investigation is a small contribution to education.

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